

Errata for *Nonlinear Composite Beam Theory*

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Page Description

- 4 The citation Hegemier and Nair (1976) should be Hegemier and Nair (1977).
- 13 The citation Popescu and Hodges (1999b) should be Popescu and Hodges (2000).
- 39 The sentence that starts on line 7 of the last full paragraph should read “Now, γ is the difference between s' times the unit tangent of the deformed beam, ‘pulled back’ to the frame b orientation by premultiplication with $\underline{\mathbf{C}}^{bB}$, and the unit tangent of the undeformed beam.”
- 50 In the last sentence of the second paragraph following Eqs. (3.81), should read, “The former is the local rotation, and the latter is the global rotation.”
- 50 The second sentence in the third paragraph following Eqs. (3.81), should read, “Thus, we have $\phi_2 = -x_2\kappa_1$, making it. . . .”
- 60 In the second of Eqs. (4.2), v should be a .
- 66 All \mathbf{B}_i on this page should be \mathbf{T}_i .
- 67 All \mathbf{B}_i on this page should be \mathbf{T}_i .
- 67 Eq. (4.26), inside the square brackets of the first line, the term $-w_2/R$ is missing, so it should read

$$\mathbf{G}_1 = \left[1 + \bar{\gamma}_{11} - x_2 \left(\frac{1}{R} + \bar{\kappa}_3 \right) - \frac{w_2}{R} + w'_1 \right] \mathbf{B}_1 + \left(w'_2 + \frac{w_1}{R} \right) \mathbf{B}_2 + w'_3 \mathbf{B}_3$$

69 In the first line of Eq. (4.34), there should be a 2 in front of the first term inside the angle brackets, so as to read

$$2\mathcal{U}_1^* = EA\bar{\gamma}_{11}^2 + EI_3\bar{\kappa}_3^2 + 2E \left\langle \frac{x_2}{R} (\bar{\gamma}_{11} - x_2\bar{\kappa}_3)^2 - \frac{w_2}{R} (\bar{\gamma}_{11} - x_2\bar{\kappa}_3) \right\rangle + O\left(\frac{EAa^2\bar{\epsilon}^2}{R^2}\right)$$

70 On second line, “The two underlined terms. . .” should read “The two underlined terms of Eq. (4.34)”

72 Eqs. (4.41) should read

$$\begin{aligned} E &= \left\langle \left\langle [G_a S]^T \mathcal{D} [G_a S] \right\rangle \right\rangle & D_{ae} &= \left\langle \left\langle [G_a S]^T \mathcal{D} [G_e] \right\rangle \right\rangle \\ D_{aR} &= \left\langle \left\langle [G_a S]^T \mathcal{D} [G_R S] \right\rangle \right\rangle & D_{al} &= \left\langle \left\langle [G_a S]^T \mathcal{D} [G_l S] \right\rangle \right\rangle \\ D_{ee} &= \left\langle \left\langle [G_e]^T \mathcal{D} [G_e] \right\rangle \right\rangle & D_{RR} &= \left\langle \left\langle [G_R S]^T \mathcal{D} [G_R S] \right\rangle \right\rangle \\ D_{ll} &= \left\langle \left\langle [G_l S]^T \mathcal{D} [G_l S] \right\rangle \right\rangle & D_{Re} &= \left\langle \left\langle [G_R S]^T \mathcal{D} [G_e] \right\rangle \right\rangle \\ D_{le} &= \left\langle \left\langle [G_l S]^T \mathcal{D} [G_e] \right\rangle \right\rangle & D_{Rl} &= \left\langle \left\langle [G_R S]^T \mathcal{D} [G_l S] \right\rangle \right\rangle \end{aligned}$$

72 Because $\Psi^T D_{ae} = 0$, Λ in Eq. (4.46) can be shown to be equal to zero.

80 In the first lines of Eqs. (4.91) and (4.92), the quantity YN^{-1} should instead be $Y^T N^{-1}$. The second line of Eq. (4.92) should read

$$+DN^{-1} [(YG^{-1}D_2 - D_3)A_3 - A_3G^{-1}(D_1G + D_2Y)]$$

81 The QQ^T on the second line of Eq. (4.106) should not be there.

81 There should be a minus sign in front of the G_1 in Eq. (4.108).

81 Eq. (4.109) should read

$$\begin{aligned} Y_1 &= AQQD_1^T + BD_2^T + Y_0G_1G_0^{-1} + CA^{-1}(Y_0G_0^{-1}D_2 - D_3)QG_0 - AQQG_0^{-1}P^TQG_0 \\ &+ \left[A(Y_0G_0^{-1}D_2 - D_3)^T - (BD_2^T + AQQD_1^T)Q^T \right] A^{-1}DA^{-1}QG_0 \end{aligned}$$

82 The second line should refer to Eq. (4.99), not Eq. (4.94).

83 The next to last sentence before Eq. (4.114) should be replaced by: “Similarly, the shear center is the point in the cross-section at which a shear force induces no twist. In an isotropic beam it is the same as the center of twist, the point about which the cross-section rotates under a pure twisting moment.”

85 Eq. (4.119) should read

$$w(x_1, x_2, x_3) = S(x_2, x_3) \left[(\hat{V}_0 + V_{1R})\bar{\epsilon} + V_{1S}\bar{\epsilon}' \right]$$

85 Eq. (4.120) should read

$$U_i(x_1, x_2, x_3) = u_i(x_1) + x_\alpha [C_{\alpha i}(x_1) - \delta_{\alpha i}] + C_{ji}(x_1)w_j(x_1, x_2, x_3)$$

85 Insert these two sentences right after the sentence that ends “. . . frame of the deformed beam” just below Eq. (4.120): “The C in Eq. (4.120) is always C^{Tb} . In the generalized Timoshenko theory one may note that $C = C^{\text{Tb}} = C^{\text{TB}}C^{\text{Bb}}$, where C^{TB} is calculated from (4.67).”

86 The next to last sentence before Eq. (4.125) should read: “One may discard κ (effectively replacing K with k) and γ terms in \mathcal{R} by virtue of the small strain approximation.”

87 The two appearances of x before Eq. (4.127) and the one appearance after Eq. (4.129) should be x_1 .

87 The third sentence in the last complete paragraph should read, “In other words the generalized shear center is at $\xi_2 = -\Phi_{34}/\Phi_{44}$ and $\xi_3 = \Phi_{24}/\Phi_{44}$; and when the reference line is placed at that point, then $\Phi_{24} = \Phi_{34} = 0$.”

90 In Eq. (4.136), κ_2 in the (2,1) element should be κ_3 , and a minus sign should be added in front of x_3 in the (2,2) and (3,2) elements.

89 Eqs. (4.132) and (4.134), Γ_w should be Γ_a .

93 In Eq. (4.156), a minus sign should be added in front of both occurrences of x_3 .

98 Eq. (4.179) should read

$$U_i(x_1, x_2, x_3) = u_i(x_1) + x_\alpha [C_{\alpha i}(x_1) - \delta_{\alpha i}] + C_{ji}(x_1)w_j(x_1, x_2, x_3)$$

106 Eq. (5.7) should read:

$$\widetilde{\delta\psi}' = -\delta C' C^T - \delta C C'^T$$

108 The second of Eqs. (5.22) should read:

$$\widetilde{\Omega} = -\dot{C} C^T + C \widetilde{\omega} C^T$$

115 In Eq. (5.50), the second line on page 115, there are two occurrences of m , both of which should be μ , so that the second line reads:

$$-\delta V^T \left[\mu \left(V - \tilde{\xi} \Omega \right) - P \right] - \delta \Omega^T \left(i \Omega + \mu \tilde{\xi} V - H \right)$$

119 The term P/GK_2 in the second part of Eqs. (5.67) should be removed.

123 In Eq. (5.92) there is a $+m$ missing from the terms in parenthesis, so that the equation should read:

$$F = F_1 e_1 + \frac{\tilde{e}_1}{s'} \left(M' + \tilde{K} M + m - \dot{H} - \tilde{\Omega} H - \tilde{V} P \right)$$

130 Equation (5.119) should read

$$\Omega = \Omega_1 e_1 + \frac{\tilde{e}_1 \left(V' + \tilde{K} V \right)}{s'}$$

178 In the last equation of Eqs. (6.98), each subscripted 2 outside the parentheses should be ,2 instead.

218 Two terms are missing from the displacement field given in Eq. (7.25). The equation for u_2 should have the additional term $-x_1 x_3 \frac{M_1}{GJ}$, and the equation for u_3 should have the additional term $x_1 x_2 \frac{M_1}{GJ}$.

221 In the first term on the right-hand side of Eq. (7.37), the 2 should go inside the angle-bracket so as to read

$$2\mathcal{U}_2 = E \left\langle 2V_1' (\gamma_{11} + x_3 \kappa_2 - x_2 \kappa_3) + \hat{w}_1^2 \right\rangle + \dots$$

225 In Eqs. (7.57), the expression for q should read

$$q = 4x_2^2 [(4 + \nu)\rho^2 + 2 - \nu] - 12x_3^2 [(2 - \nu)\rho^2 + \nu] - 3b^2 [16\rho^4 + 8\rho^2 + \nu(13\rho^4 + 2\rho^2 + 1)]$$

273 The last paragraph, first line, should read, "... to be addressed...."

276 Fig. A.3 should be replaced by Fig. 1 herein.

282 The last sentence before the epilogue should read as follows: The values are listed for each Gaussian point identified by its location as: " $x_2, x_3, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{22}, \sigma_{23}, \sigma_{33}$," where σ_{ij} are the components of the recovered 3-D stress tensor at this Gaussian point.

296 The Hegemier and Nair (1976) citation should be Hegemier and Nair (1977), and the volume and year should be volume 15 and 1977, respectively.

297 The Popescu and Hodges (1999b) citation should be changed to Popescu and Hodges (2000), and the year should be changed to 2000.

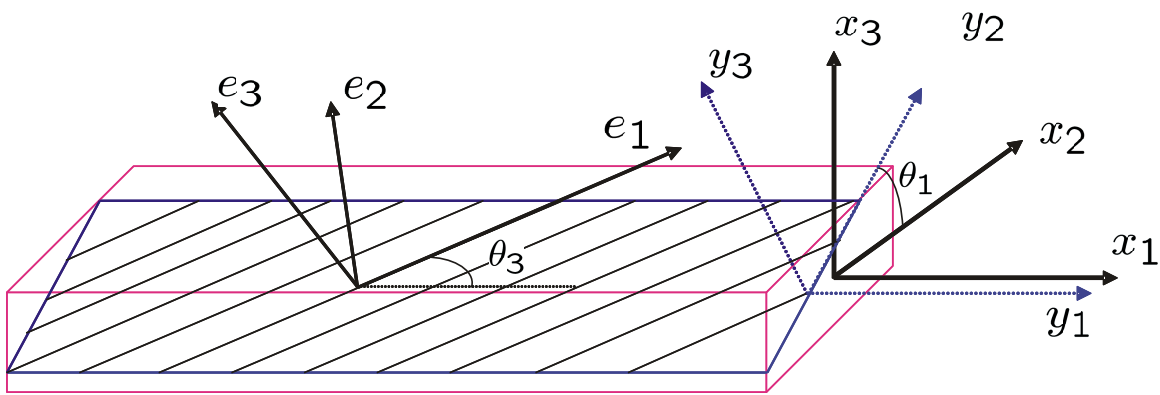


Figure 1: VABS layup convention